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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,820	10/24/2003	Chester Ledlie Sandberg	5659-20900/EBM	1426
7590 08/18/2008 DEL. CHRISTENSEN SHELL OIL COMPANY P.O. BOX 2463 HOUSTON, TX 77252-2463				
EXAMINER				
PAIK, SANG YEOP				
ART UNIT		PAPER NUMBER		
3742				
MAIL DATE		DELIVERY MODE		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/693,820

Applicant(s)

SANDBERG ET AL.

Examiner

Sang Y. Paik

Art Unit

3742

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1691-1753 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1691-1753 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/5508)
Paper No(s)/Mail Date 5/16/08
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1691-1697, 1699-1717 and 1719-1753 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eastlund et al (US 4,716,960) in view of Van Egmond (US 5,065,818) or Bell et al (US 4,382,469), and Rose (EP 0130671).

Eastlund shows the system claimed including a heater well extending into a hydrocarbon formation, a heating element located in the heater well and transfer heat from the heating element to hydrocarbons such the paraffin deposited in the heater well, and an AC supply with a voltage above about 200 volts. Eastlund further shows the heating element having a copper inner core with a steel outer conductor, but it does not explicitly disclose an overburden formation and that the steel outer conductor is ferromagnetic.

Van Egmond or Bell shows that it is well known in the art that a heater well is provided through an overburden formation and into zones for heating or carbonizing the hydrocarbon containing zones. Bell further shows that it is also well known in the art to employ the in-situ process.

Rose shows a heating element having an inner core made of copper with an outer conductor made of a ferromagnetic carbon steel which allows the heating element to be self-

regulating. Rose further discloses that its heating element is configured such that the heater automatically reduces its heat output near or above a selected temperature including the Curie temperature of about 760 °C.

In view of Van Egmond or Bell, and Rose, it would have been obvious to one of ordinary skill in the art to adapt Eastlund with the heater well that extends through an overburden formation and into the hydrocarbon containing formation at least about 10 m or more to effectively heat such hydrocarbon containing layer and provide the heating element as shown in Rose to provide a self-regulating heating element to more conveniently maintain a desired heating temperature. And in view of Bell, it would also have been obvious to one of ordinary skill in the art to employ the in-situ process for processing the hydrocarbons as alternative and additional means for heating.

Regarding claim 1711, the limitation that the selected temperature is "within about 50 °C of the Curie temperature of the ferromagnetic material" fully reads on Rose since the selected temperature disclosed in EP130671 (i.e., the Curie temperature) falls within the claimed range.

Regarding claims 1699 and 1719, Rose discloses a number of different iron-nickel alloys with varying Curie temperatures suitable as ferromagnetic materials for autoregulating electric heaters. See P. 14, Table I (noting that iron-nickel alloys have relatively lower Curie temperatures compared to other ferromagnetic materials).

Regarding claim 1700 and 1742, see P. 9, lines 24-26 of Rose.

Regarding claim 1702 and 1722, see P. 6, lines 24-28 of Rose.

Regarding claim 1744, because (1) the heater of Rose utilizes the skin effect of the conductor to ultimately dictate its heating, (2) the inverse relationship between frequency and

skin depth is well known (see P. 2, lines 11-28), and (3) a wide frequency range of 50 Hz - 10 KHZ is envisioned (see P. 8, line 19-23), the heater of Rose would inherently control the skin depth in the conductor by varying the applied frequency.

Regarding the recited values of the amps or current, the reduced heat above or near the selected temperature and the turndown ratio, since no criticality is seen in these specific values and since such specific values claim optimized result-effective variables, it would have been obvious to one of ordinary skill in the art to include such values in operating the heating system as being well within the scope of routine experimentation by skilled artisans depending on the desired temperature and heat output. It is well settled that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 456, 105 USPQ 233,235 (CCPA 1955).

3. Claims 1698 and 1718 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eastlund in view of Van Egmond, Bell, and Rose as applied to claims 1691-1697, 1699-1717 and 1719-1753 above, and further in view of Bridges et al (CA 2,151,521).

Eastlund in view of Van Egmond, Bell, and Rose shows the system claimed except for a three-phase power source. But powering a downhole ferromagnetic electric heater with a three-phase power source is well known in the art as evidenced, for example, by Bridges noting Figs. 11 and 12 and P. 32, line 11 - P. 35, line 21. As is well known in the art, three phase loads take advantage of the higher voltage and power level associated with three-phase power distribution.

In view of Bridges, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a three-phase power source in the previously described system to

take advantage of the higher voltage and power Level associated with three-phase power distribution.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1691-1753 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1691-1749 of copending Application No. 10/693,700 or claims 1691-1759 of Application No. 10/693,840.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the copending claims include the recited system including a heater well, an AC supply, one or more electrical conductors comprising a ferromagnetic material in the heater well for heating the hydrocarbon formation except for the AC supply providing a voltage above about 200 volts. But since the voltage is proportionally related to the desired heating output, it would have been obvious to provide the voltage at the recited volts or any other volts to achieve a corresponding heating output, i.e., higher the output higher, the voltage desired.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

6. Applicant's arguments filed 5/8/08 have been fully considered but they are not persuasive.

The applicant argues Eastlund does not show the heater well that extends through an overburden of the formation and transfers heat to the hydrocarbon containing layer. It is noted that Eastlund shows a heater well, which includes a heater therein, extends into a formation

wherein the heater provides a heat for heating hydrocarbons deposited in the heater well, but as indicated in the ground of rejection, Eastlund does not explicitly show an overburden formation. For such overburden formation, the Van Egmond and Bell references are alternatively applied. Van Egmond shows an overburden formation formed near the surface wherein a heater well, including a heater, extends there through for heating the hydrocarbon containing zone. Bell also shows the overburden formation through which a heater is provided. In view of such known formation with the overburden formation that is formed near the surface, the heater well in Eastlund would have extended through the overburden formation for heating the hydrocarbon containing layer.

The applicant argues that in Eastlund teaches for heating the fluids containing the hydrocarbon and not the hydrocarbon containing layer itself, and further argues Eastlund does not provide heat to the lower portion of the well that are closer to the hydrocarbon containing layer. It is noted the hydrocarbon containing layer is a broad recitation which includes any layer that includes hydrocarbon. A fluid layer that contains hydrocarbon would meet the recited hydrocarbon containing layer. Furthermore, there is no other recitation that would distinguish the recited layer from that of Eastlund. Also, as shown by Van Egmond, it is known that a heater would extend into a hydrocarbon containing zone layer for heating the hydrocarbon.

The applicant argues that Van Egmond discloses a contrary teaching as that of Eastlund by stating that the power supply cables in Van Egmond generates heat at a lower rate and only an insignificant amount of heat while supplying all of the current to the heated zone. This is not a contrary teaching but that is well known in the art of operating a heating element. One of ordinary skill in the art would not want to generate heat in the power supply cable but to the

heating element where much heat is generated and is desired. The purpose of the power supply cable is to supply heat and not to generate heat. This, Van Egmond is not shown to disclose a contrary teaching as that of Eastlund. With respect to Bell, it is noted that Bell is applied to show the heater that extends through an overburden formation, and Bell which shows a DC supply rather than the AC supply does not show a contrary teaching over Eastlund since the overall objective remains the same which is to provide an adequate heating to the underground formation containing carbon or hydrocarbon.

With respect to Rose, the applicant argues Rose does not show or teach transferring heat to a hydrocarbon containing layer. It is noted, however, that Rose is applied to teach a known electrical heating element having the ferromagnetic sections and its advantageous use in the heating cable shown in Eastlund (Figures 7-10). The applicant argues that Eastlund teaches away from Rose since Eastlund shows providing a maximum current flow along the inner wall with little current over the outer wall of the tubing while Rose would teach providing significant current flow in the outer wall of the tubing. It is noted that Eastlund shows different heating elements and the applicant's argument relates to the tubing and sucker rod heating element whereas the Rose reference is applied to supplement that of the coaxial heater as shown on Figures 7-10. Thus, the applicant's arguments are not deemed persuasive.

All other claims are deemed met and taught by the applied prior art as indicated in the ground of the rejections.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Y. Paik whose telephone number is 571-272-4783. The examiner can normally be reached on M-F (6:30-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on 571-272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sang Y Paik/

Primary Examiner, Art Unit 3742

syp